

STATE OF IDAHO
DEPARTMENT OF FISH AND GAME
Ross Leonard, Director

EVALUATION OF SPAWNING OF KOKANEE AND TROUT IN LAKE
PEND OREILLE AND TRIBUTARY STREAMS IN IDAHO
June 1, 1959 to May 31, 1960

Annual Summary Report Investigations Project

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BIOLOGICAL & ECONOMIC SURVEY OF FISHERY RESOURCES IN LAKE PEND OREILLE

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EVALUATION OF SPAWNING BY KOKANEE AND TROUT IN LAKE PEND OREILLE AND TRIBUTARY STREAMS IN IDAHO

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Introduction

This is the ninth of a series of annual reports dealing with surveys of spawning of kokanee and trout in Pend Oreille Lake and its tributaries. Information regarding purposes, techniques, participating agencies, location maps, and other data are available in previous reports.

Findings

Pend Oreille Lake

During the period of kokanee spawning on the shoals of Pend Ore Lake (November 20 - December 31), the lake elevation was lowered about 1-1/4 feet, or from 2057.5 to 2056.25. The lake was held near the 2056-foot level throughout the winter and spring kokanee incubation period. The minimum level was 2055.9 in latter April (See Table 1).

Extreme reduction of lake level was avoided during the period of kokanee spawning and incubation. The maximum drawdown by Albeni Falls Dam during this period was 1.6 feet. The lake was about six feet above the natural level, which resulted in abundant spawning area at inundated beaches. Spawning was widely scattered with most nests near docks and spring seeps at depths of 2 to 10 feet (2055 to 2045 m.s.l.).

Scattered spawning occurred from Bernard Point to the Clark Fork River along the east side of the lake and from Buttonhook Bay to Talache on the west side. Heaviest spawning in these areas was near the Bayview and Lakeview docks. Some 10,000 kokanee were estimated in the Bayview area from Krugers' to Hudson Bay Resorts on November 24. About 1500 were estimated in Ellisport Bay on November 23. Light spawning also occurred

Table 1. Lake Elevations for Lake Pend Oreille, Idaho, June 1, 1959 to May 31, 1960
(Courtesy Corps of Engineers) 8 a.m. Reservoir Stage,

Day	feet											
	June 1959	July 1959	August 1959	September 1959	October 1959	November 1959	December 1959	January 1960	February 1960	March 1960	April 1960	May 1960
1	2058.53	2061.28	2062.25	2062.26	2062.33	2060.83	2056.66	2056.62	2056.55	2056.83	2057.12	2057.05
2	.51	.35	.30	.25	.37	.34	.64	.67	.63	.50	.06	56.82
3	.60	.54	.17	.27	.31	.02	.62	.69	.65	.48	56.96	.52
4	.82	.61	.15	-	.13	59.83	.56	.60	.58	.52	.90	.13
5	59.12	.77	.20	.41	.06	.57	.51	.57	.61	.78	.82	.12
6	.52	.97	.19	.37	.05	.41	.54	.66	.63	.74	.78	.27
7	.95	62.06	.21	.22	.07	.44	.57	.63	.71	.58	.89	.41
8	60.34	.06	.26	.21	.00	.26	.57	.61	.68	.62	.90	.54
9	.78	.00	.30	.23	.00	.07	.57	.67	.71	.69	.87	.63
10	61.04	.16	.22	.26	61.81	58.88	.58	.70	.67	.58	.93	.60
11	.23	.26	.31	.38	.62	.68	.60	.67	.64	.45	.99	.48
12	.23	.24	.33	.35	.42	.54	.63	.72	.63	.26	57.07	.41
13	.23	.20	.35	.36	.42	.46	.62	.70	.62	.19	.30	.47
14	.25	.32	.34	.32	.57	.40	.58	.62	.63	.24	.68	.59
15	.34	.35	.35	.37	.63	.30	.65	.60	.69	.31	.81	.97
16	.44	.40	.37	.33	.59	57.93	.77	.62	.62	.20	.70	57.45
17	.61	.28	.22	.23	.40	.79	.74	.53	.60	.13	.50	.83
18	.69	.24	.20	.16	.44	.60	.74	.36	.56	.09	.31	58.09
19	.72	.24	.14	.14	.49	-	.84	.41	.60	.05	.13	.10
20	.74	.14	.14	.13	.40	.53	.80	.45	.60	.02	.14	.15
21	.86	.17	.12	.08	-	.60	.57	.45	.65	55.93	.33	.21
22	.89	.23	.13	.12	.08	.38	.76	.45	.66	.91	.52	.20
23	.92	.30	.18	.16	60.79	.68	.61	.50	.68	.86	.64	.04
24	.95	.26	.20	.20	.64	.59	-	.60	.64	.97	.82	57.90
25	.95	.24	.20	.35	.73	.34	.46	.46	-	56.09	.91	.78
26	.86	.23	.20	.40	.50	.16	.33	.47	.57	.22	.90	.62
27	.74	.23	.22	.47	.42	56.91	.26	.45	.60*	.45	.86	.50
28	.60	-	.18	.40	.51	.78	.30	.47	.55	.65	.88	.37
29	.46	.18	.20	.40	.67	.69	.36	.64	.51	.83	.66	.15
30	.30	.20	.26	.36	.78	.59	.52	.68	-	.96	.30	56.87
31		.24	.27	.33	.83	.66	.54	.61		57.06		.73

*estimate - line out of order

at the mouths of streams in Garfield and Camp Bays, at Hoppers Resort, East Hope, and Bottle Bay. No evidence of kokanee spawning was found in the Pend Oreille River. Incubation was slow, with eyed eggs being observed as late as May 14, indicating that the development period extended through the spring months.

Mortality of eggs and fry due to drawdown of the lake was negligible. Some mortality of eggs was observed at the Bottle Bay site on December 29 where spawning was very shallow.

Tributary Streams

Kokanee spawning runs in tributary streams appeared light, probably because abundant spawning area was available in the lake, especially near the mouths of streams.

Kokanee spawning was heaviest near the railroad bridges in the Clark Fork River, at the mouth of Lightning Creek, in the side channel east of the town of Clark Fork (about 1000 kokanee), Granite Creek (about 20,000), Spring Creek (2000), North Gold Creek (2000), and South Gold Creek (200).

Fluctuation of flow in the Clark Fork River destroyed virtually all eggs in the side channel but had little effect on those in the main river.

Scattered spawning by Dolly Varden was observed in Lightning, Spring (about 30 pairs), Granite, North Gold, and South Gold Creeks and the Clark Fork River. Large Dolly Varden were observed or reported in several other tributaries, also.

Kamloops rainbow spawners were observed in Spring, Grouse, and Rapid Lightning Creeks. About 100 kamloops were seen, mostly in Spring Creek near the Clark Fork Hatchery. On May 3, 17 spent 24- to 38-inch kamloops were netted, tagged, marked, and released in Ellisport Bay

from Spring Creek. One tag was returned by a fisherman in June. The fish was caught near Lakeview some 25 miles from the point of release. Size of Kokanee

Length frequency data were obtained from 1014 kokanee spawners (Table 11 and figure 1). The average length of 563 males was 10.9 inches; the average of 451 females was 10.5 inches. The standard deviations of the mean lengths were .36 and .34 inches, respectively. The low standard deviations and normal curve indicate that the majority of kokanee spawners were from one year class, probably the progeny of the 1954 spawning population.

Table 11. Average lengths of kokanee spawners, Lake Pend Oreille, Idaho, 1959

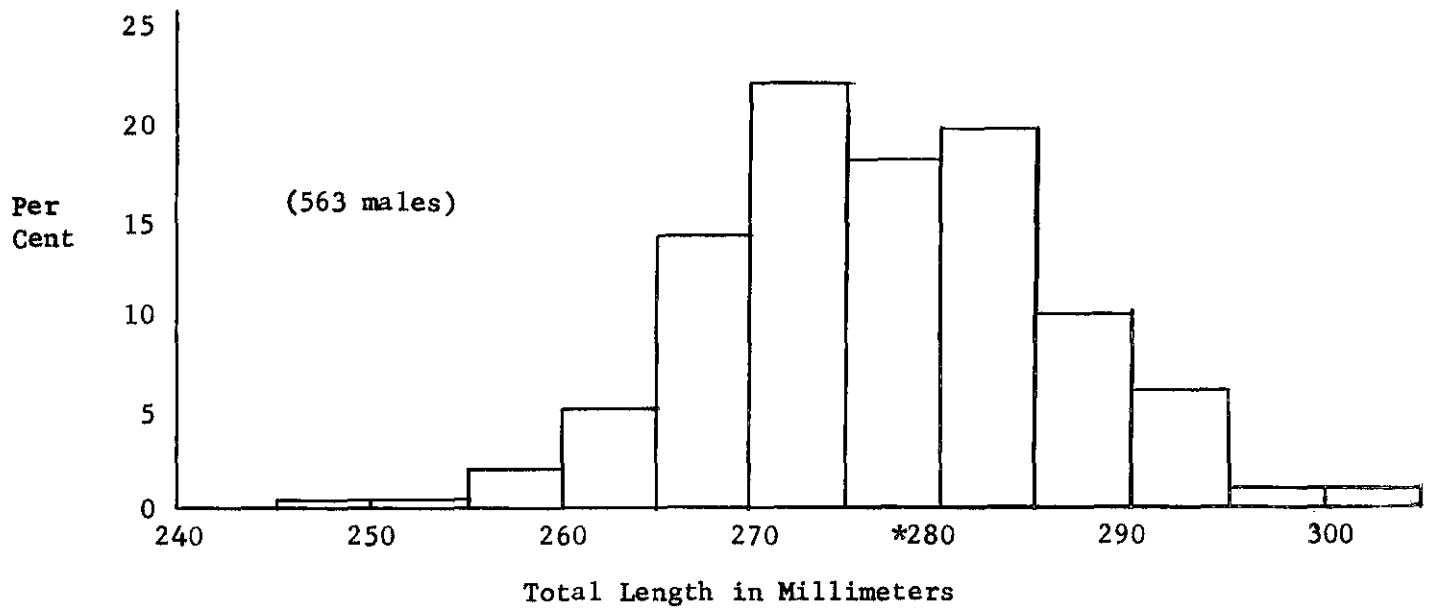
Location	Date	Number measured		Average Lengths	
		Males	Females	Males mm	Females mm
Bayview	11-24	310	208	278(10.9")	267(10.5")
Mouth of Granite Cr.	12-1	115	145	278(10.9")	267(10.5")
Mouth of No.Gold Cr.	12-17	138	98	273(10.7")	262(10.3")
Total or Average		563	451	277(10.9")	266(10.5")

Egg-planting experiments

During the spring of 1958, 1959, and 1960 eyed kamloops eggs were planted in Granite Creek with the purpose in mind of developing a kamloops spawning run in this stream.

In March of 1958, 231,000 eyed eggs from kamloops brood stock at the Clark Fork Hatchery were taken from hatchery trays, and 20 ounces (6080) placed in each of 38 smaller trays. These were covered with damp cloths to prevent drying. The trays were then placed in a well-iced

Figure 1. Length frequency distribution of kokanee spawners from Lake Pend Oreille,
1959



* mean length

insulated egg packing box. Because of impassable roads, the eggs were hauled by boat to the mouth of Granite Creek, taken from the box, and carried on trays the 1/4 mile upstream to the planting site. Temperatures were ideal as hatchery water, air, eggs, and planting water were all approximately 40 degrees Fahrenheit. The eggs were planted in seven large artificial redds at depths of 2 to 6 inches in the stream bottom at gravelly riffles. Redds were excavated with a shovel; a plank and large bottomless box-like enclosure were used to deflect the current while the eggs were being deposited in the gravel. After covering, the redds were slightly higher than the surrounding-stream bottom. The stream bed was composed of equal parts of sand, pea-size gravel, and larger rock. Each nest was checked 10 days after deposition. Survival of eggs was over 99 percent at that time; however, subsequent high flow and deposition of sand and gravel from upstream erosion probably caused considerable mortality prior to emergence of fry.

On April 23, 1959, some 206,000 (676 ounces) eyed kamloops eggs were planted in artificial redds in Sullivan Springs, a tributary of Granite Creek. The eggs were hauled from the Clark Fork hatchery by automobile in two 10-gallon cream cans. The water at this site has a constant flow and temperature of 43 to 44 degrees Fahrenheit. This site was preferred to the site used during 1958 because of the constant flow and water temperature, lack of erosion, and absence of predatory fish. Eggs were covered with 1 to 5 inches of gravel and sand. The site was checked frequently; fry were beginning to swim up by June 12, at which time survival was determined to be 86 percent. Numerous fry were noted in the stream until late summer.

On April 29, 1960, eyed kamloops eggs totalling 187,920 (648 ounces) were transported by boat in two cream cans to the mouth of



Figure 2. Site in Sullivan Springs where kamloopa eyed eggs were planted showing method of sampling for survival rate.

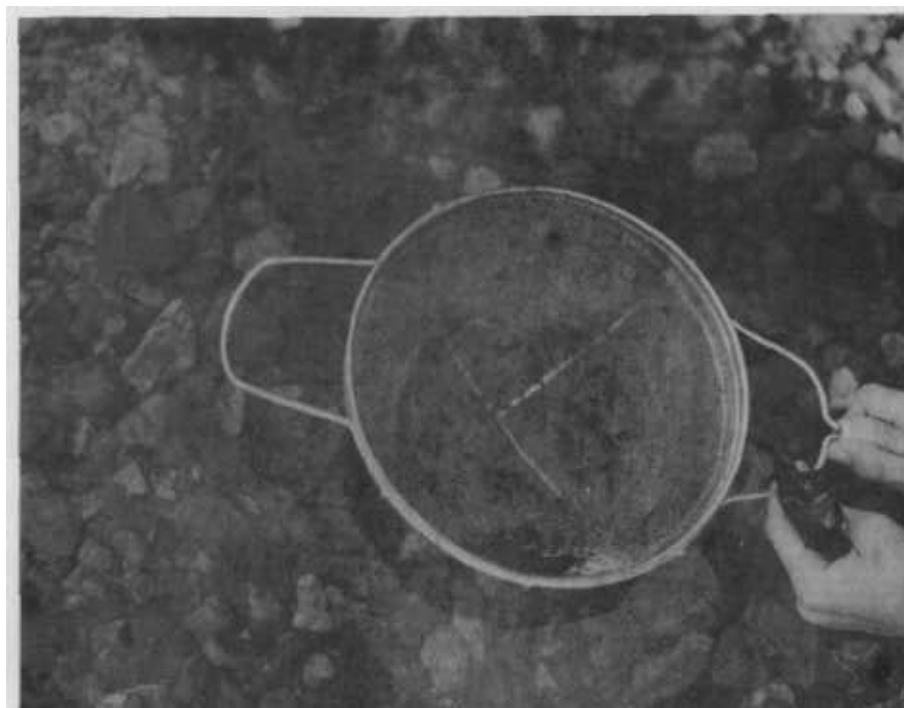


Figure 3. Sample of kamloops fry from an artificial redd. Type of bottom material at the Sullivan Springs site is also illustrated.

Granite Creek, from where they were carried to the Sullivan Springs site. All conditions, except method of transportation, were similar to the previous year. The plant showed an immediate loss of about 50 percent of the eggs. Survival thereafter was good. Numerous fry were observed in Sullivan Springs in July.

Data and Reports

All data and reports are on file in the offices of the Idaho Fish and Game Department at Boise, Idaho, or the Area Biologist at Sagle, Idaho.

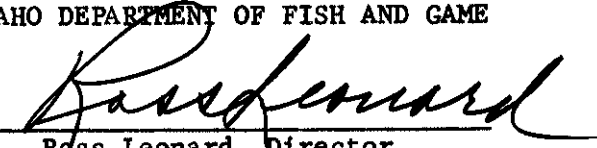
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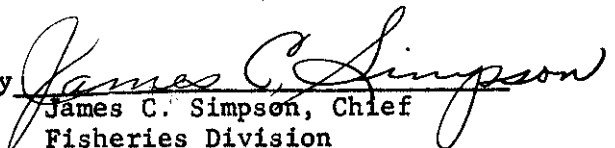
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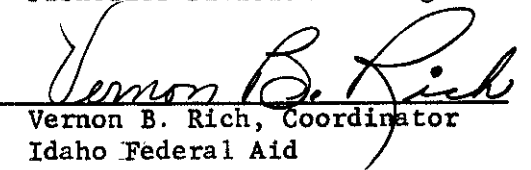
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